



**General Certificate of Secondary Education
June 2011**

Geography A

40301H

(Specification 4030)

Unit 1: Physical Geography (Higher)

Post-Standardisation

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for standardisation each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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GENERAL GUIDANCE FOR GCSE GEOGRAPHY ASSISTANT EXAMINERS

Quality of Written Communication

Where candidates are required to produce extended written material in English, they will be assessed on the quality of written communication.

Candidates will be required to:

present relevant information in a form and style that suits its purpose;
ensure that text is legible and that spelling, punctuation and grammar are accurate;
use specialist vocabulary where appropriate.

Levels Marking - General Criteria

Where answers are assessed using a level of response marking system the following general criteria should be used.

Level 1: Basic

Knowledge of basic information
Simple understanding
Little organization; few links; little or no detail; uses a limited range of specialist terms
Reasonable accuracy in the use of spelling, punctuation and grammar
Text is legible.

Level 2: Clear

Knowledge of accurate information
Clear understanding
Organised answers, with some linkages; occasional detail/exemplar; uses a good range of specialist terms where appropriate
Considerable accuracy in spelling, punctuation and grammar
Text is legible.

Level 3: Detailed

Knowledge of accurate information appropriately contextualised and/or at correct scale
Detailed understanding, supported by relevant evidence and exemplars
Well organized, demonstrating detailed linkages and the inter-relationships between factors
Clear and fluent expression of ideas in a logical form; uses a wide range of specialist terms where appropriate
Accurate use of spelling, punctuation and grammar
Text is legible
Level 3 does not always equate to full marks, a perfect answer is not usually expected, even for full marks.

Annotation of Scripts

One tick equals one mark, except where answers are levels marked (where no ticks should be used). Each tick should be positioned in the part of the answer which is thought to be credit-worthy.

Where an answer is levels marked the examiner should provide evidence of the level achieved by means of annotating 'L1', 'L2' or 'L3' in the left hand margin.

The consequent mark within this level should appear in the right-hand margin.

Ticks must not be used where an answer is levels marked.

Examiners should add their own brief justification for the mark awarded e.g. *Just L3, detail and balance here.*

Where an answer fails to achieve Level 1, zero marks should be given.

The following is a list of the unit-specific annotations available on the CMI+ system:

desc.	- describe	eg	- example
exp.	- explain	cs	- case study
ben.	- benefits	ldfm	- landform
prob.	- problem	Gl.	- global

General Advice

Marks for each sub-section should be added in the right-hand margin next to the maximum mark available which is shown in brackets. All marks should then be totaled in the 'egg' at the end of each question in the right-hand margin. The totals should then be transferred to the boxes on the front cover of the question paper. These should be totaled. The grand total should be added to the top right-hand corner of the front cover. No half marks should be used.

It is important to recognize that many of the answers shown within this mark scheme are only exemplars. Where possible, the range of accepted responses is indicated, but because many questions are open-ended in their nature, alternative answers may be equally creditworthy. The degree of acceptability is clarified through the Standardisation Meeting and subsequently by telephone with the Team Leader as necessary.

Diagrams are legitimate responses to many questions and should be credited as appropriate. However, contents which duplicate written material or vice versa should not be credited.

Quality of Written Communication (QWC) is part of the award of marks in levels marked answers only. In levels marked answers the quality of the geography is assessed and a level and mark awarded according to the geography. As is sometimes the case, the geography may be sound at a particular level but the examiner may not be sure as to whether there is quite enough to raise the mark within that level. In this case the examiner should consider the QWC of the answer. QWC that fulfils the criteria for the level should lead to the rise in the mark but where the QWC does not fulfil the criteria, the answer should remain at the mark first thought appropriate. In cases where QWC has been used in the award of marks, the examiner should indicate this with QWC and arrows that indicate either an upward or downward trend according to its impact on the final award of the mark.

SECTION A

Question 1: The Restless Earth

- 1 (a)** Any 2 differences – must be differences not individual statements. **(2 marks)**
e.g. Continental crust is lighter than oceanic crust/less dense; continental is older than oceanic crust, continental crust cannot be renewed and/or destroyed/ subduct. Continental crust is thicker.
2×1 **AO1 – 1**
AO2 – 1
- 1 (b)(i)** 1 mark for drawing sketch – shape should resemble that in Figure 1. **(3 marks)**
2×1 for labelling clear features of the volcano, such as crater, rim of crater, steep sides, cone shape, ash/loose material on sides, ridges on sides. **AO2 – 1**
Arrows must connect to feature labelled or labels written on top of feature. **AO3 – 2**
1 + (1+1).
- 1 (b)(ii)** There should be reference to two (continental) plates moving apart. This is the result of convection currents in the Earth's crust that determine the direction of movement. As they pull apart, a 'gap' is created between the plates. This is filled by magma rising up out of the mantle to plug the gap and make the crust complete. As this occurs again and again, layers of lava solidify and build up to create volcanoes. This often happens under the oceans. **(4 marks)**
AO1 – 2
AO2 – 2

Level 1 Basic (1-2) marks

A partial explanation – may have start, end or random parts of sequence.

Sequence incomplete.

Plates move apart and a gap is left. Lava builds up in the hole. Volcanoes are found there.

CMI annotation

- **L1 Partial explanation. Incomplete sequence**

Level 2 Clear (3-4 marks)

Stages are clear and explanation is coherent and complete.

Sequence complete.

Develops and links points.

Plates pull apart due to convection currents in the mantle. A gap is created, which is plugged by rising magma. This cools to form lava. As the plates shift apart again, more magma is released from the mantle to fill the gap and the layers build up to form a volcano under the ocean.

Diagrams may be drawn to support text.

CMI annotation

- **L2 Clear and sequential. Explanation clear**

- 1 (c) (i)** There should be reference to a very large scale/ a mega (colossal) eruption / where at least 1000 cubic km of material is erupted (so very large eruption). May note caldera / not classic volcano shape – tend to be sunken surrounded by area of higher land. Flat areas. May indicate size/shape by contrasting with a volcano. 1 mark for size, 1 mark for shape. **(2 marks)**
AO1 – 2
- 1 (c) (ii)** A case study is not needed but Yellowstone is likely example that would be referred to. Effects likely to refer to impact in immediate area of an eruption – many deaths (87000 predicted), large ash cloud rising 40 – 50km into atmosphere, destruction of 10000 square km of land, ash 15cm thick covering buildings within 10000km, flights suspended, livestock and farmland affected. The UK would see the arrival of the ash 5 days after the eruption; temperatures would fall between 12 and 15 degrees. Parts of Europe and America and Asia would see constant snow cover for 3 years, crops would fail, monsoon rains would fail, 40% of population could face starvation. **(6 marks)**
AO1 – 3
AO2 – 3

Level 1 Basic (1-4 marks)

Describes effects of a supervolcano eruption.

Statements are general in a random order.

Lots of people will die. There will be huge amounts of ash. People will choke to death. Buildings will collapse. Crops and animals will die. People will starve. In Yellowstone, there would be no planes.

CMI annotation

- **L1 Describes effects**
- **L1 Describes variety of effects**

Level 2 Clear (5-6 marks)

Effects are clearly described, in an organised way.

There is clear reference to global aspect.

Statements are linked.

One in three people will be killed within 1000km of an eruption. Buildings would collapse within this area due to the weight of the ash. This would ground planes and make road transport difficult. Livestock would die as they would choke in hot ash.

UK (England) would see the arrival of the ash about 5 days later. This will circle the Earth, changing the climate. Temperatures will fall by 10 degrees and this will make it difficult to grow food in many areas. Certain parts of northern Europe will be snow covered for 3 years, so no food will be able to be grown.

CMI annotation

- **L2 Links statements. Worldwide aspect has clear focus**

- 1 (d)** Actual content will depend on the case study being used – Andes and Alps are likely but any (young) fold mountain range is permissible. **(8 marks)**
Uses are likely to be farming, hep, mining and tourism. **AO1 – 4**
Farming – reference to the growing of subsistence crops, such as potatoes on terraces – steps made to create flat areas. Most crops are grown in lower parts of valleys, including some cash crops such as cotton. Llamas are used as pack animals – the males, whilst the females are used for meat. Milk and wool are used for clothes and rugs. **AO2 – 1**
H.E.P – steep, narrow valley are suitable for construction of dams and steep relief gives fast flowing water needed to turn the turbines. Peru has a number of schemes, including Yuncan project and El Platinal project that is under construction. **AO3 – 3**
Mining – the Andes is rich in minerals – tin, nickel, silver and gold are all present.
Yanacocha gold mine in Peru is the largest in the world and has led to the expansion of the town of Cajamarca from 30000 to 240000 inhabitants.
Tourism – high mountains provide spectacular scenery of high peaks, valleys, lakes and glaciers. In addition, there are ancient areas of settlement such as Macchu Picchu and the Inca Trail – a 45km trek in the mountains.

Level 1 Basic (1-4 marks)

Describes use(s) of fold mountains.

There may be general reference to the photographs – these may be described.

Statements are general in a random order.

No case study.

There are large dams and lakes. There is farming in the valley. Cattle are kept. Big areas are used for mining. There are scars on the landscape. The rock is dug out.

CMI annotation

- **L1 Describes uses – generic**
- **L1 Describes a variety of uses - generic**

Level 2 Clear (5-6 marks)

Describes uses (at least two) of fold mountains clearly.

Clues are taken regarding types of use from the photographs.

Statements are linked.

There is clear reference to the case study named – rings true for case study.

A large area is used for mining in the photograph. This is like a big quarry where it is dug out of the surface. There are many resources of gold, silver and tin in the Andes. This is blasted out. The walkers/skiers show the area is important for tourism. In the Andes, there are a number of long walks like the Inca Trail where people can view the spectacular mountains.

CMI annotation

- **L2 Clear description, links statements. Reference to case study**

Level 3 Detailed (7-8 marks)

Will describe two or more uses of fold mountains.

Photographs are used to describe uses and linked to case study.

Statements are logically ordered and linked.

Detailed reference to specific case study.

There is a large area of mining – this is like a big quarry where it is dug out of the surface. There are many resources of gold, silver and tin in the Andes. The Yanacocha gold mine is opencast like in the picture. This led to the rapid increase in the nearby town of Cajamarca. The walkers/ skiers show how people go to enjoy the spectacular scenery. The Inca Trail in Peru attracts many walkers. This is a long distance hike of 45km and ends in the historic settlement of Machu Picchu, which is the 'Lost City of the Incas'.

CMI annotation

- **L3 Detailed description and reference to photo and case study**

Total 25 marks

Question 2: Rocks, Resources and Scenery

- 2 (a)** Igneous rocks are formed by magma being cooled. This may occur below or on the surface/intrusive and extrusive. Igneous rocks are very hard/resistant to erosion. They contain a variety of crystals. Coarse texture.
2×1 **(2 marks)**
AO1 – 2
- 2 (b) (i)** Rocks are weathered, e.g. by change in temperature – freeze thaw weathering. This weakens the rock and makes it easy for small particles (sediment) to be eroded. These are then transported by rivers to the sea. They are deposited onto the sea bed. Subsequent deposition above leads to the lower layers being compressed/compacted to form sedimentary rock.
Must refer to 2 processes for 3 marks.
3×1 or 1+(+1). **(3 marks)**
AO1 – 1
AO2 – 1
AO3 – 1
- 2 (b) (ii)** Weathering is the effect of weather, such as temperature change, rain, wind on rock (examples of weather needed for mark). It is weakening of rock / disintegration of rock. This occurs in situ/rock stays in one place / no movement involved. Types of weathering. 2 or more - mechanical/physical, chemical and biological.
2×1 **(2 marks)**
AO1 – 2
- 2 (b) (iii)** Exfoliation is also known as onion skin weathering. This occurs when the outer layers of rock are heated more during the day than the layers below the surface. This causes these to expand more than the underlying ones. At night, cooling and contraction occurs with similar differences to those that occurred with the heating in the day. The repetition of this process over time leads to the outer layers peeling away from the layers beneath the surface – like the skin of an onion.
Diagram(s) should illustrate this content. **(4 marks)**
AO1 – 1
AO2 – 2
AO3 – 1

Level 1 Basic (1-2 marks)

Simple diagram(s) probably partial.

Simple labels.

Order not correct – jumps about.

Sequence may be incomplete.

CMI annotation

- **L1 Simple, partial diagram/sequence**

Level 2 Clear (3-4 marks)

Complete, clear, diagram(s)

Diagrams illustrate clear labels – that are developed and linked.

Sequence of exfoliation is clear.

CMI annotation

- **L2 Clear complete sequence supported by diagrams**

- 2 (c)** Description should refer to upstanding mass of rock/rock outcrop of varying heights. Seems to be on upland area and stands tall above the surrounding area. It varies in height – right hand side is lower; there are cracks/joints in the tor that are vertical and some are horizontal. The feature is grey in colour and lacks vegetation cover over much of it. They are formed due to differential weathering of rock. That which is most jointed – such as on the right of the photo – is weathered more easily. There may be detail on freeze-thaw weathering (depending on source used), or the role that chemical weathering played during warmer conditions. Reference may be made to the exposure of the tors by ice and subsequent exposure of these by erosion and role of freeze thaw weathering. **(6 marks)**
- AO1 – 3**
AO2 – 3

Level 1 Basic (1-4 marks)

Simple statements, perhaps list like at lower end.

May describe or seek to explain only at lower end – but if well done can get to top of level.

Some reference to photo in description.

Explanation will be partial.

Tors are big piles of rock on top of hills. They are made of granite. They are cracked. The one in the picture is higher on the left. Some of the stones on top seems loose. They are formed by weathering.

CMI annotation

- **L1 Describes/explains only. Simple statements**
- **L1 Some description/explanation. Refers to photo.**

Level 2 Clear (5-6 marks)

Develops statements and makes links.

Photograph clearly referred to.

Sequence clear and complete.

Tors are large outcrops as shown in the picture. The left side is higher than the right. There are many horizontal cracks as well as vertical ones. These joints vary in their width apart. They are closer together on the right. This is important in the formation of the tors. Whilst the rock was underneath the surface, chemical weathering was greater in the areas that were more jointed as the water could get into the rock easier and break it down. When the surface weathered rock was removed during the Ice Age, the tor- where the joints were generally further apart than elsewhere was exposed.

CMI annotation

- **L2 Description/explanation. Clear, complete sequence.**

- 2 (d)** Response will depend on what rock type(s) is/are used. There is likely to be more than one as this makes the question easier to answer, some may use all rock types but there is no requirement to do so. There must be reference to more than one use. **(8 marks)**
- AO1 – 4**
AO2 – 4

Response should demonstrate specific knowledge of case study and places, facts therefore should be noted.

Uses should refer to source of building stone, production of cement, farming, aquifers and tourism. There should be clear reference to the benefits/advantages. It is likely that there will be an economic, possibly social emphasis but there may be reference to environmental aspects.

Level 1 Basic (1-4 marks)

Simple statements, perhaps list-like at lower end.

May be only one use – tourism/building stone/cement likely.

May describe uses rather than benefits.

Separate ideas.

Generalised statements.

People have jobs quarrying stone. Some people work on transport lorries.

The chalk gives a local supply of water. Lots of people work in shops for the visitors.

CMI annotation

- **L1 Simple, separate ideas**
- **L1 Some variety of use/benefits**

Level 2 Clear (5-6 marks)

Develops statements and makes links.

May refer to more than one use – may be imbalance – or one well done.

There is clear reference to the case study/ies.

Lots of people work quarrying granite in Cornwall. There are entire communities that rely on the work. Some people have jobs taking the stone to market. Chalk aquifers can provide a source of water for people. This has happened in the Thames valley and London where there is an aquifer in the London Basin.

CMI annotation

- **L2 Begins to develop and link benefits of use of landscape. Reference to case study**

Level 3 Detailed (7-8 marks)

Detailed development of statements, response is organised and focused.

Detailed, balanced reference to more than one use.

Case study is specifically referred to and points made relate to this – detailed factual information.

Tourists can benefit local areas. In Castleton, many people go to see the limestone scenery and the caves. This provides many jobs in the caves themselves as guides, but also in centres such as Castleton where there are many cafes, restaurants and souvenir shops. Farmers on Dartmoor make a living farming sheep. They make a living from this and can increase their income by looking after the environment. They are paid to reduce numbers and increase hedgerows so that the activity benefits both the farm and the environment. At Lafarge Cement in Hope in Derbyshire, over 75000 trees have been planted.

CMI annotation

- **L3 Develops and links benefits to using landscape. Detailed reference to case study.**

Total: 25 marks

Question 3: Challenge of Weather and Climate

- | | | |
|-------------------|---|-------------------------------------|
| 3 (a) (i) | Any valid labels – warm front, cold front, warm sector, (centre of) low pressure, anti-clockwise winds.
Arrows must point to specific/appropriate location.
3×1 | (3 marks)

AO2 – 1
AO3 – 2 |
| 3 (a) (ii) | Isobars are circular in shape. Pressure is low/lowest in the middle (below 984 mb). Pressure increases from the centre. Closely spaced. | (2 marks)

AO2 – 1
AO2 – 1 |
| 3 (b) | Temperature – cool initially and then getting warmer as warm front approaches. Cloud – cloud thickens, layer cloud – stratus and cirrus as warm air rises over cold, then thins and possible breaks as warm sector passes to be followed by thick, vertical, cumulus clouds as cold front approaches and cold air forces warm air to rise quickly. Precipitation – prolonged, relatively light rain as the wider warm front passes, then drier, possibly drizzle and breaks in rain and heavy rain, possibly snow with cold front. Wind increases as warm front approaches and pressure falls as warm front approaches, steadies as warm sector passes and increases to be at its strongest as cold front passes. Pressure starts to fall ahead of the warm front, continuing to do so as the warm front passes. It then steadies before rising as cold front passes. | (6 marks)

AO1 – 4
AO2 – 2 |

Level 1 Basic (1-4 marks)

Simple statements, may be mainly description.

Changes should be described.

Will be some explanation, but confused in places.

Random order.

Temperatures start off cool. They don't stay the same.

Temperatures rise. The rain gets less in the middle. It rains heavier as the warm front passes. The cloud is thick with warm and cold front. It is colder with the cold front.

CMI annotation

- **L1 Simple statements – general description**
- **L1 Describes changes and begins to explain some stage(s) covered**

Level 2 Clear (5-6 marks)

Begins to develop points and to link ideas.

Explanation of changes is clear.

Sequence of passage of depression will be present with reasoning.

As the warm front passes, temperatures start to rise as the warm air takes over from cold air. Cloud increases – low level and thick- and it begins to rain steadily as the rising air is cooled. As the warm sector passes, it is quite mild and rain becomes lighter or it becomes fine as there is less uplift. As the cold front passes, temperatures fall and rain increases.

Rain is heavier due to the cold air undercutting the warm air and causing rapid uplift.

It is windiest at this time and the direction will change from SW to NW around the centre of the low.

CMI annotation

- **L2 Focus on changes and reasons for them linked to stages of depression**

3 (c) (i)

The clear trend is for temperatures to increase. There is also clear fluctuation.

Global temperatures increase by 2.7°C; the Northern Hemisphere has the higher increase of 3.5°C and the Southern Hemisphere the lesser increase of 2.1°C.

The lines follow each other at different levels after 2030. Initially, the lines are very similar, almost the same, but separate when temperature increase goes above 1°C in 2030. The more rapid rise seems to be between 2030 and 2050 when the temperature change doubles from 1 – 2°C.

(4 marks)

AO1 – 2

AO3 – 2

Level 1 Basic (1-2 marks)

Simple statements.

May be very general or very detailed description.

May identify a trend/s.

Temperatures go up. They go up in the world and Northern and Southern Hemisphere. The world increases by 0.2°C by 2010 and has gone down to 0.1°C by 2020. It then goes up to 0.6°C by 2030 etc.

CMI annotation

- **L1 Simple statements – partial, piecemeal**

Level 2 Clear (3-4 marks)

Statements are developed and linked.

Trends are clearly identified.

Evidence is used to support points.

Global temperatures by 2.75°C. Increases are greater in the Northern Hemisphere after 2030, when temperatures everywhere have increased by 1°C./The trends fluctuate with rises and falls occurring every so many years e.g. the start of decades 2040 and 2050 and 2070. Increases in the two hemispheres diverge and there is a predicted difference of 1.5°C by 2100.

CMI annotation

- **L2 Describes trends and offers evidence in support**

- | | | |
|-------------------|---|--|
| 3 (c) (ii) | 1 for basic statement and 1 for elaboration. Cause may be natural or human. E.g. Changes in way earth orbits around the sun (1) will lead to closer proximity and so greater warmth (1); Burning of fossil fuels such as coal and oil (1) leads to the release of carbon dioxide (1) which is a greenhouse gas (1) and significance of this (1).
1×(1+1) | (2 marks)

AO1 – 2 |
|-------------------|---|--|

- | | | |
|--------------|--|--|
| 3 (d) | Responses are required at a global/international level, so reference should be made to international agreements such as Kyoto and strategies for looking at worldwide emissions via carbon credits. Explanation should relate to the way in which all countries must take responsibility as atmosphere does not recognise political barriers. There is no point some countries reducing levels of greenhouse gases and others not. However, within this context, more national/regional strategies may also be appropriate – i.e. a recognition of how targets to reduce emissions may be reached, Thus, switching to renewable sources of energy, use of vehicle excise tax in UK, recycling, traffic management. | (8 marks)

AO1 – 4
AO2 – 4 |
|--------------|--|--|

Level 1 Basic (1-4 marks)

Simple statements, perhaps list like at lower end.

Separate ideas – description only (or explanation).

A local/national focus may be present.

In London, they try to get people to use public transport. There is a congestion charge where people have to pay to get their cars into the centre. Car tax is higher for bigger cars.

CMI annotation

- **L1 Simple separate ideas. Description or explanation only**
- **L1 Some additional information or a variety of responses**

Level 2 Clear (5-6 marks)

Develops statements and makes links.

Describes and explains – although may be clear imbalance.

There is some reference to international/global approach.

There is an agreement between a lot of countries to cut carbon emissions. This is the Kyoto Protocol and means they have to reduce their carbon emissions. This means the world will benefit as the gases affect everywhere. People can also help individually – by conserving energy e.g. by turning lights off, recycling so that new bottles and cans don't have to be made.

CMI annotation

- **L2 Makes links. Description and explanation and some reference to global response**

Level 3 Detailed (7-8 marks)

Fully developed statements that are linked.

Describes and explains – in a more balanced account.

The global element is properly addressed.

To try and reduce greenhouse gas omissions, 37 countries signed the Kyoto Protocol.

These countries must reduce their 1990 carbon emissions levels by 5.2% by 2012. This is a step to reducing emissions worldwide where all countries need to take part as gases are not contained by political boundaries. Carbon credits aim to identify an overall amount of emissions by allowing countries to trade in amounts. Local strategies are also important as 'every little helps' so turning lights off, using buses rather than cars will reduce our use of fossil fuels.

Governments switching to wind power and introducing transport strategies such as congestion charging all play a part.

CMI annotation

- **L3 Detailed linked statements. Description/explanation both addressed and global aspect to the fore**

Total: 25 marks

Question 4: Living World

- 4 (a) (i)** An ecosystem refers to the plants and animals – living things – in an area and their interaction/interrelationship with non – living things that affect them, such as climate and soils. An ecosystem can be a variety of scales from very small to worldwide.
2×1 or 1+1 **(2 marks)**
AO1 – 2
- 4 (a) (ii)** Any 3 valid points e.g. often found around the Tropics – 20 – 30 degrees north and south, more extensive in Northern Hemisphere, a number are on western side of continents such as South America and Africa. The largest expanse is across northern Africa, into the Middle East and Asia. Allow 1 for negative description.
3×1 **(3 marks)**
AO2 – 1
AO3 – 2
- 4 (b) (i)** There should be reference to the vegetation shown in the photographs. There is no need to refer to all 3 photographs, but 2 should be used. Any valid point that is visible e.g. There is a large cactus – it has a thick stem with only 4 ‘branches’ coming from it. Its surface is ridged. The tree has all its branches near the top. The leaves are needles and seem to be in clumps with a flower at the end. The bush has small leaves; these are quite close to the ground and there are many thin stems, that are silver in colour. **(4 marks)**
AO1 – 1
AO3 – 3

Level 1 Basic (1-2 marks)

Simple statements

One photo only referred to.

General description with limited reference to photos.

There are cacti in the deserts. They grow tall and have spiky, fine needles. The one on the picture has 4 small bits coming off it.

Vegetation grows quite low and does not cover the whole area.

Some have small leaves.

CMI annotation

- **L1 Basic description – generic simple points**

Level 2 Clear (3-4 marks)

Begins to develop points and to link ideas.

Clear description with specific reference to photos.

There is a cactus – a saguaro cactus that is very tall. About half way up 4 parts branch from it. The surface of it is ridged and there seem to be fine needles on the ridges that stick out. The bush has thin stems that are silver in colour. Its leaves are near the ground and they are small; there may be yellow flowers on the bush.

CMI annotation

- **L2 Specific reference to photo. Links statements**

4 (b) (ii)

Likely to consider the different ways plants adapt to a lack of water. Command is to explain so there must be an understanding of the way plants adapt, not just description. May describe what the climate is like to set scene – rainfall under 250mm per year, temperatures high in day – 25 degrees plus (depends on area/context). Some plants store water in their stems such as cacti. This gives a supply when there is no other. Some grow very quickly after rain, flower, seed and die awaiting the next period of rain. These avoid the dry conditions as they are only present after rain. Some adapt their features so that they resist the dry conditions – such as having small leaves (creosote bush) spiky leaves (Joshua tree) and so reduce water loss by transpiration. Others have long hairy leaves for the same purpose – wind has less effect – (desert yellow daisy), the thick bark of the Joshua tree helps to reduce water loss. There are various ways the roots are adapted to the conditions – some have shallow roots so that they can get water when it is available after rain – e.g. saguaro cactus, others have very long roots to try to reach water deep underground – e.g. sagebrush has a tap root of 25m. The need to access water may be seen as a factor linked to the soils. As well as being very dry, desert soils have very little organic content, and are infertile. They tend to be salty and some species are resistant to such conditions, e.g. desert holly, sage brush.

(6 marks)

AO1 – 3

AO2 – 3

Level 1 Basic (1-4 marks)

Simple statements

Statements are generalised and separate.

May describe climate, or note adaptations – likely to be separate or tentatively linked.

Likely to refer to climate only.

Explanation is tentative, partial understanding.

Climate is very dry and hot. Plants have small, waxy leaves to save water. The desert has lots of flowers after rain. Some things just grow when there is rain. They disappear after.

CMI annotation

- **L1 Simple statements describing climate or adaptations**
- **L1 Begins to explain and link climate or soil to vegetation**

Level 2 Clear (5-6 marks)

Develops points.

Linked statements – may have specific species.

Climate linked to adaptations.

Some reference to the influence of soil. Explanation is clear.

Vegetation adapts in a number of ways. Some plants have shallow roots to get rain when it falls – such as saguaro cactus; other have long tap roots so that they can reach water that is deep in the rock as the soil is very dry.. Some plants grow, flower just after rain and their seeds wait for the next period of rain. Needles are thin and mean there is less water loss, so precious water is saved in the dry conditions. Others have waxy or hairy leaves that also reduce transpiration. Plants like desert holly can withstand the salty soil

CMI annotation

- **L2 Links features of vegetation to climate. Emphasis on explanation and some reference to soil**

- | | | |
|-------------------|--|--|
| 4 (c) (i) | Any valid cause – likely to be logging, mining, hep schemes, ranching subsistence farming, settlement. There needs to be a brief description of the cause – e.g. forest has to be cleared for mining, so that resource can be accessed/quarried/for roads into mine.
1+1 | (2 marks)

AO1 – 2 |
| 4 (c) (ii) | Case studies likely to be dependent on those appearing in related texts. AQA endorsed book uses Malaysia; Amazonia also likely to be a popular choice. Effects likely to relate to environmental impacts – such as effect on water cycle. Soil and erosion, possibly climate and rainfall amounts as well as forest itself and biodiversity; social such as displacement of local people, loss of culture, introduction of new diseases to which locals are not immune, loss of potential medicines/drugs from forest plants, economic such as money made, export trade, reducing country's debts. | (8 marks)

AO1 – 4
AO2 – 4 |

Level 1 Basic (1-4 marks)

Simple statements, perhaps list like at lower end.

Describes effects of deforestation – in a random way.

Information is general.

Trees will disappear and soil will be washed away. The trees will be sold so people will make money. Local people may have to get off their land. Floods may increase.

CMI annotation

- **L1 Simple ideas. Describes effects – generic**
- **L1 Some limited description of ideas or variety**

Level 2 Clear (5-6 marks)

Develops statements

Organised description of effects

Some reference is made to the case study.

The environment will be affected. 140000 hectares of forest are cut down each year in Malaysia. This means that there are fewer trees and the variety of trees will fall with so many being cut. Soil will be washed away. But for some chopping trees down is a good thing as they make money from the tin mines in Malaysia.

CMI annotation

- **L2 Develops ideas – links statements. Some reference to case study**

Level 3 Detailed (7-8 marks)

Fully developed statements.

Purposeful description of a variety of effects.

Specific, detailed reference is made to the case study.

140000 hectares of forest are cut down each year in Malaysia. This means that biodiversity will be less. The loss of the protective cover will increase soil erosion. The loss of certain species may mean the potential for development of cures for Aides will be lost. People lose their homes due to deforestation. In Malaysia 9000 Kenyah people have been forced to leave because a dam is being built for hep for the industrial area of Malaysia. This benefits that area, but is a disadvantage for the locals. Locals protested against a logging company in Sarowak and were put in prison.

CMI annotation

- **L3 Develops and links effectively. Detailed effects with specific reference to case study**

Total: 25 marks

SECTION B

Question 5: Water on the Land

- 5 (a)** Four processes are relevant – hydraulic action, abrasion, attrition and solution. **(3 marks)**
There should be reference to how these work e.g. hydraulic action is the force of the water against the bed and banks, this is most effective when the river is in high flow. **AO1 – 3**
Abrasion occurs when the load being carried hits the bed and the banks, whilst attrition is the reduction in size of the load itself as it knocks into other items of material. Solution occurs when certain rock types, such as limestone or chalk are dissolved by the slightly acidic rainwater.
May also refer to vertical, lateral and headward erosion.
Maximum 1 for list of 2 or more processes.
3×1

- 5 (b) (i)** Any valid label e.g. meander, narrow neck of meander/swan's neck meander, contrast in how exaggerated meanders are, possible ox bow lake, flat valley floor/flood plain. **(3 marks)**
1 mark for channel – 1 mark for valley. **AO1 – 1**
3×1 **AO2 – 1**
AO3 – 1

- 5 (b) (ii)** Cross-section should show asymmetrical profile and label the inside bend and the outside bend. The following characteristics are likely to be noted – gentle slip off slope on the inside bend, where the water is shallow. There is deeper water on the outside bend. A steep slope in the form of a river cliff, which is often undercut by the river is found here. **(4 marks)**
NB There is no credit for processes here. **AO1 – 1**
AO2 – 1
AO3 – 2

Level 1 Basic (1-2 marks)

Simple diagram – may be a sketch or plan.

Simple labels.

Some confusion between inside and outside bend.

CMI annotation

- **L1 Simple diagram and labels**
- **L1 Partly correct**
- **L1 One part of bend only**

Level 2 Clear (3-4 marks)

Clear cross section that shows asymmetrical shape.

Cross section has clear labels.

Contrast between inside and outside bend is clear.

CMI annotation

- **L2 Clear diagram, differences clear via labels**
-

5 (b) (iii)	<p>There should be reference to meanders and a focus on the outside bend where the fastest flow of water is found. This results in erosion here. As a result, the outside bends move closer together as the meander neck becomes narrower. This is a swan's neck meander and as the process continues, the meanders move closer and closer together. When there is a very high discharge, the river cuts across the neck and takes a straight course. The role of subsequent deposition. The former meander is left as a horseshoe shaped ox-bow lake.</p>	(4 marks)
	Level 1 Basic (1-2 marks)	AO1 – 3
	<p>Simple points. Order not correct – jumps about. Sequence may be incomplete.</p>	AO2 – 1
	CMI annotation	
	<ul style="list-style-type: none"> L1 Simple points, incomplete sequence 	
	Level 2 Clear (3-4 marks)	
	<p>Complete, clear, statements. Statements are developed and linked. Sequence and formation of ox bow lakes is complete and clear.</p>	
	CMI annotation	
	<ul style="list-style-type: none"> L2 Clear and complete sequence/explanation 	
5 (c) (i)	<p>There may be reference to what flooding is – that rivers flood when they burst their banks. Allow 1 for this, but emphasis should be on underlying causes such as building towns on floodplains and creating an impermeable surface so that water cannot infiltrate and thus flows quickly over surface to river, reducing lag time. There should be recognition of the factor from the information and this then needs using to explain the sequence of events that cause flooding. May refer to only one cause or two or more.</p>	(3 marks)
		AO2 – 1
		AO3 – 2
5 (c) (ii)	<p>Actual content will depend on strategies selected. Can refer to advantages of selected strategy or disadvantages of one that is rejected. For example if hard engineering is selected, likely to note the effectiveness of dams holding back water to control flooding. (Three Gorges Dam has reduced risk from 1 in 10 years to 1 in 100 years), may refer to the fact that many dams and reservoirs are multi-purpose projects and so there are other advantages such as hep and water supply. This approach means that something is being done to control flooding and that people's lives and their property should be safe. It means that people do not have to live in fear of flooding or face the consequences of cleaning up or losing family and friends. It is more immediate than strategies like planting trees that take a long time to grow. Warning systems may save people's lives, but their property is damaged and their possessions and so this is not good way of managing floods. They will be able to prepare but will suffer much more than if a dam had been built.</p>	(8 marks)
	Level 1 Basic (1-4 marks)	AO1 – 4
		AO2 – 4

Describes 1 or 2 strategies.

Simple statements, may be in a random order.

Certain things are built in certain places. Next to the river, there are playing fields and car parks, housing is further away. In some areas, building is not allowed. Trees are planted to slow down to flow of water.

CMI annotation

- **L1 Describes strategy. Simple points**
- **L1 Describes strategies. Some development**

Level 2 Clear (5-6 marks)

Begins to consider why the strategy selected is better option.

Advantages of option clear and/or disadvantages of alternative are included.

Statements are developed and linked.

Land use zoning means that land next to the river may be used as farmland or recreational use, but buildings are not allowed. This reduces the impact of flooding.

It costs nothing and does not have any negative impact on the environment – the river floods in a natural way. Planting trees slows down the speed of the water and reduces flooding. It can improve the environment, but works with the natural environment.

CMI annotation

- **L2 Begins to explain reasons for chosen option. Statements begin to be developed and linked**

Level 3 Detailed (7-8 marks)

Clearly focused on why the strategy selected is better option.

Advantages of option clear and/or disadvantages of alternative in a discussion.

Statements are developed and linked.

Land use zoning means that land next to the river may be used as farmland or recreational use, but buildings are not allowed. This reduces the impact of flooding.

It costs little, just the need to plan and does not have any negative impact on the environment – the river floods in a natural way. This is a much cheaper option than building up banks and creating dams and reservoirs, which have a bad effect on the environment. They interfere with the rivers natural processes, causing erosion after a dam. Over time, the lake behind the dam will silt up as the water is not flowing as it would in the river. Planting trees slows down the speed of the water and reduces flooding. This tries to help slow down the water cycle in a natural way, rather than controlling a river with a dam which is also very expensive. It works with the natural environment. Warning people of floods is useful as they can prepare, taking their possessions to higher floors – floods can still happen with dams and people may not be prepared if they are not warned.

CMI annotation

- **L3 Clear focus on why strategy selected. Explains clearly why it is better option**

Total: 25 marks

Question 6: Ice on the Land

- 6 (a) (i)** Glacial budget refers to the inputs/additions to the glacial system (1) such as snowfall/avalanches (1) and the outputs/losses from the system (1) such as melting ice (1) and the overall balance between them/accumulation versus ablation (1) – whether there are more inputs than outputs so that the glacier gets bigger (1) or reversal of this (1). 3×1 or 1+(1+1) **(3 marks)**
AO1 – 3
- 6 (a) (ii)** Figure 12 shows that the glacier has reduced in size/the glacier has retreated (1) – by 1200—1400m (1) towards south (1). This has occurred at the end/snout of the glacier especially (1), although width has reduced from 1840 size/become narrower (1). Speed of retreat seems to have increased (1) as 500m were lost in the 47 years to 1992 in contrast to about 170m between 1840 and 1906 – a 66 year period (1). Presence of Sunwapta lake where glacier used to be (1). **(3 marks)**
AO2 – 1
AO3 – 2
- 6 (a) (iii)** There should be reference to an increase in temperatures over time (not just seasonal ones) which will cause melting. There may be reference to the glacial budget and the relative levels of accumulation versus ablation. There should be a consideration of what may have caused this – whether it is part a natural cycle or whether it is linked to global warming. Here, there is an increase in greenhouse gases, especially carbon dioxide which prevents heat from escaping and so causes overall warming. There may be reference to the sources of the gases, such as the burning of fossil fuels, increased car ownership etc. Some may refer to changes in Earth's orbit around the sun, the tilt on the axis, changes in ocean currents – and impacts – El Nino. **(4 marks)**
AO1 – 2
AO2 – 2

Level 1 Basic (1-2 marks)

Simple, separate points.

Likely to focus on global warming - in a general way.

The glacier has shrunk. This is due to it getting hotter. People use more coal and oil in factories and cars and pollute the air. This stops the heat escaping and the Earth gets warmer and the glaciers melt.

CMI annotation

- **L1 Simple reason(s) - general**

Level 2 Clear (3-4 marks)

Points are developed and linked.

Causes are explained clearly – with reference to process and gases if global warming is the focus.

May/will refer to other, natural causes.

Increasing temperatures are the cause of the glacier retreating. This may be due to global warming, where the increased use of fossil fuels in industry and transport has led to an increase in the amount of carbon dioxide in the atmosphere. This acts like a blanket and prevents long wave radiation from escaping. It could also be due to natural changes the tilt of the Earth on its axis may have changed slightly so that the angle to the sun is different and so its gets warmer.

CMI annotation

- **L2 Reasons are developed and linked**

6 (b) Any valid characteristic that is visible on the photograph e.g. the presence of meltwater in channels on the surface; the unevenness of the surface; the presence of lines in the ice; the colour of it – that it is not white, but contains debris/ moraine material that makes it look dirty. **(3 marks)**
AO2 – 1
AO3 – 2
 3×1

6 (c) A glacier begins to occupy a former river valley. The ice, as a solid, cannot wind around the interlocking spurs and so these are eroded. Abrasion is important in this process where the glacier uses its load to wear away the rock as well as plucking where ice pulls away material beneath it and to the side of it. The depth of the ice is often marked by a break in slope on the glacial trough. **(4 marks)**
AO1 – 3
AO2 – 1

Level 1 Basic (1-2 marks)

Simple points.

Sequence is partial. Process only.

Ice in a valley erodes the bottom and the sides. It is deeper and changes from a V – shape to a U – shape as ice cannot wind around the spurs that stick out on either side.

CMI annotation

- **L1 Simple partial sequence**

Level 2 Clear (3-4 marks)

Points are developed and linked.

Geographical terminology used.

Complete sequence.

Ice begins to occupy a former river valley. It is much deeper than the river and fills much of it. Ice erodes the interlocking spurs by abrasion and plucking. The ice freezes to the rock and pulls pieces away when it moves. It then uses this material in the abrasion process. This gives a very steep valley side where the spurs have been truncated and the valley is much wider and deeper.

CMI annotation

- **L2 Clear and complete sequence/explanation**

6 (d) There are a number of causes of avalanches – which are masses of snow and ice moving at speeds of up 300km per hour. The primary causes relate to natural conditions, but people can be responsible either directly or indirectly. Heavy snow is the main cause over a period of time when new layers are added to old, so that distinct layers are present that are unstable. Increasing temperatures can cause melting that will encourage movement as the meltwater lubricates the slope, rain can have the same effect. Steep slopes of more than 30 degrees are prone to avalanches due to the impact of gravity. People chop down trees to aid the development of ski runs. This removes an obstacle to moving snow and increase the scale of an avalanche. People can directly cause avalanches by skiing off-piste. Here, fresh, loose snow in quantity is unstable and is not made safe as in on designate ski runs and avalanches are often triggered. It is combination of factors that is responsible. **(8 marks)**
AO1 – 4
AO2 – 3
AO3 – 1

Level 1 Basic (1-4 marks)

Knows what avalanches are.

Simple causes, may be varied.

Avalanches occur when large amounts of snow and ice move down a mountainside at very fast speeds. This may be due to a lot of snow, steep slopes, warmer temperatures in spring.

CMI annotation

- **L1 Describes an avalanche. Simple cause**
- **L1 Describes causes**

Level 2 Clear (5-6 marks)

Clear understanding of avalanches.

Causes are known – at least two.

Statements are linked.

Seeks to explain part of sequence is present on two or complete on one.

Avalanches of snow and ice can move down a slope at speeds of up to 300km per hour. There are a number of causes. Heavy snowfall is an important one. This builds up and the layers are unstable and tend to separate as the avalanche occurs. Temperatures can melt the snow and make it easy for the snow and ice to slip down the slope.

CMI annotation

- **L2 Clear description of causes. Links statements and begins to develop**

Level 3 Detailed (7-8 marks)

Understands the hazard and is aware of a variety of causes.

Statements are linked and detailed.

Focus is on explanation and sequences are clear and precise.

Avalanches of snow and ice can move down a slope at speeds of up to 300 km per hour. Heavy snowfall is an important cause. As snow falls on a number of occasions, different layers build up. These are unstable due to gravity and as they have different characteristics and tend to separate, causing an avalanche to occur. This is made worse by the steep slopes – often of 30 degrees or more. Melting snow and rainfall can increase the likelihood of avalanches occurring as they lubricate the path the avalanche is to take. People can also cause avalanches. Skiers who are off-piste on fresh snow can trigger avalanches by moving over it when it has not been prepared for skiing unlike the compaction that takes place on the main slopes.

CMI annotation

- **L3 Detailed description of a variety of causes. Focus on explaining why they occur**

Total: 25 marks

Question 7: Costal Zone

- 7 (a) (i)** Diagram should show land/coast, beach, sea and direction of prevailing wind. (3 marks)
 Particle should be shown with movement up the beach an angle and labelled swash; down the beach at right angles to the coast and labelled the backwash; and movement overall of the material along the beach labelled as direction or longshore drift.
 1 for sketch and 2 x 1 for labels.
 3×1
AO1 – 1
AO2 – 1
AO3 – 1
- 7 (a) (ii)** Deposition occurs when there is too little energy to transport material and so it is left behind. This occurs where the coast is sheltered and so waves are not very powerful; where constructive waves are present it can occur when too much material is being carried – where there is a large supply of sediment being brought down by rivers; where there is high coastal erosion nearby; where groynes are placed on the beach. (3 marks)
 3×1 or 1+(1+1)
AO1 – 3
- 7 (b) (i)** Any valid statement relating to landforms. 1 only for list of 2 or more landforms as description is required. There are steep, almost vertical cliffs in the foreground. These seem to be undercut as the top part overhangs. A cave can clearly be seen to the left and further back a wave-cut platform emerges from the sea. Headlands and bays; reference to uneven coastline. (3 marks)
 3×1
AO2 – 1
AO3 – 2
- 7 (b) (ii)** There are alternating bands of hard and soft rock at right angles to the coast. The hard rock erodes slower than the soft rock – so erosion occurs at different rates. This means that the areas of hard rock stick out into the sea as headlands and the soft rock areas are set back as inlets, often with beaches. The softer rock is more susceptible to the force of the waves and abrasion is more effective. (4 marks)
AO1 – 3
AO2 – 1

Level 1 Basic (1-2 marks)

Simple points – will have partial explanation.

Sequence is partial.

There are headlands that stick out. These are eroded slower than the bays that are set back from the rest of the coastline.

CMI annotation

- **L1 Partial sequence. Separate statements. Description – begins to explain**

Level 2 Clear (3-4 marks)

Points are developed and linked.

Geographical terminology used.

Complete sequence and reference to process as explanation is to the fore.

The coast is composed of two different rock types. Bands of alternating hard and soft rock are found at right angles to the coast. The hard rock is more resistant to erosion and so sticks out from the line of the coast to form headlands. In contrast, the softer rock is more easily eroded by hydraulic action – the sheer force of the water and abrasion – where pebbles are thrown at the coast. These areas form bays that are set back from the coast.

CMI annotation

- **L2 Develops and links points. Clear complete sequence – explains**

7 (c)

Content will depend on case study used. Expect reference to Norfolk coast such as Happisburgh, Barmston, Mablethorpe in Holderness and Barton-on-Sea, Hampshire which is example in endorsed textbook. Effects are likely to refer to people's houses being threatened by collapse; their loss in value; difficulty in selling them and getting them insured; the stress of this and the uncertain future is also valid. Many people make a living out of tourism and their livelihood is threatened. Caravan parks and camp sites have been moved back in a rollback policy in some areas. People believe the coast should be defended, whilst the government may not and there are vigorous campaigns to try to get a change in policy or develop local strategies. The effect on the environment is the retreat of the coastline – at often rapid rates during storms e.g. 30 metres lost at Happisburgh in 2002, landslides become more common.

(8 marks)

AO1 – 4

AO2 – 4

Level 1 Basic (1-4 marks)

Simple points, may be list like.

Generalised, applicable to anywhere where cliff collapse is an issue.

May refer only to people's lives or the environment.

Statements may be in a random order. Ideas are separate.

Land is lost when cliffs collapse. People's homes will go into the water. Some may lose their jobs. People will be stressed. Their houses will not be worth much. Landslides will occur.

CMI annotation

- **L1 Describes effects – basic, simple points. Peoples lives/environment only**
- **L1 Some development of points, variety of effects**

Level 2 Clear (5-6 marks)

Point are developed and linked.

Refers to case study – points relate to case study quoted.

Refers to both effects on people's lives and the environment.

Begins to be discursive.

In Happisburgh Norfolk, many metres of land can be lost to the sea. 30 metres was lost in 2002. This has a real impact on people, as their houses may be threatened or even lost to the sea. This means that people lose the value of their home and may get nothing for it – may not be able to get it insured which isn't fair. It is very stressful, not knowing whether your house is safe. People may lose their businesses as well as their homes as cliff top cafes are threatened.

CMI annotation

- **L2 Begins to develop and link points. Some reference to both people and environment and refers to case study**

Level 3 Detailed (7-8 marks)

Fully developed statements

Purposeful description of a variety of effects.

Specific, detailed reference is made to the case study.

Discusses points.

The continued erosion of areas of Holderness at a rate of 10 metres a year in some places has a real effect on people. People's homes are threatened and many cannot sell their homes for anything worthwhile – often people cannot get insurance and end up losing everything. This occurs even though when they bought the house, there was no immediate danger. Some lose businesses such as Sue Earle who lost her farm – and had to pay demolition costs. This is very stressful. Caravan parks at Barmston are being moved back from the cliffs, but in the long term there is no certainty that they will be safe.

CMI annotation

- **L3 Discusses effects on people and environment. Specific detailed reference to case study**

7 (d)

The coast will change from its smooth shape today to having a number of bays. There are 5 expected to form. The bays will not all be the same size – the largest one will be south of Mableton and the smallest to the north of Mableton. The reason for the changing shape lies in the coastal protection – with the ends of the bays being the areas that have been protected. Thus, areas such as Hornsea with a sea wall and rock armour and Mableton with rock armour and groynes will have slower rates of erosion. The power of the waves will be concentrated between these points.

(4 marks)

AO1 – 1

AO2 – 1

AO3 – 2

Level 1 Basic (1-2 marks)

Describes changes, erosion or protection.

Statements may be in a random order.

Ideas are separate.

Bays will form on the coast. There will be 5. Some will be bigger than others. The biggest one is near Mappleton. Erosion is fastest there.

CMI annotation

- **L1 Description of changes. Simple separate statements.**

Level 2 Clear (3-4 marks)

May begin to explain.

Describes changes clearly.

Clear sequence, statements are linked.

Explanation is clear.

Bays form along the coast where there is no protection. This is because the waves can attack the cliff base more easily. Areas that are protected, such as Bridlington and Mappleton, have measures that protect the bottom of the cliffs from erosion. Sometimes, groynes can hold sand in one place, exposing areas further down the coast.

CMI annotation

- **L2 Links statements. Focus on explanation. Linked to management**

Total: 25 marks

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